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<b>Section:</b> Bacteriology Procedures	Subject Title: <b>Quality Control Manual</b>	
Prepared by QA Committee		
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## QUALITY CONTROL MANUAL

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<b>Vitek Quality Control</b>	See <a href="#">Vitek Manual</a>

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## MAINTENANCE OF ISOLATES FOR QUALITY CONTROL

### STOCK CULTURES

Reference strains for quality control are originally obtained from ATCC, Microbiologicals or other commercial sources as lyophilised cultures. Follow manufacturer's instructions and subculture these lyophilised cultures. Upon receipt, each new strain will be entered in Soft like a patients specimen (see order entry instructions [Appendix II - Ordering New QC Organisms in Soft](#)) and then frozen in triplicate in the appropriate QC storage box. See [Laboratory Information Systems](#) for Freezing QC Strains in SoftStore.

Store the sub-cultured isolates in trisodium citrate glycerol at -70°C. These frozen cultures are used as STOCK CULTURES and can be stored indefinitely at -70°C. To replenish stocks, obtain from ATCC, Microbiologicals or other commercial sources as lyophilised cultures.

Stock cultures are subbed according to a schedule to maintain optimum performance. See [Schedule for Subculture of Stock Cultures Table](#).

### WORKING CULTURES

Working cultures are stored on TSB agar slants at 4° to 8°C or on Chocolate agar or Blood Agar for fastidious organism. See the [Working List of Quality Control Organisms](#) for storage requirements and freezer location.



These cultures are replaced monthly by sub-culturing twice to the appropriate solid media from the frozen Stock Cultures. The fresh subcultures are then placed in the appropriate racks and the previous months cultures are discarded.

Virus working cultures are propagated in the appropriate tube culture cell lines.

### BEFORE TESTING

Before testing, cultures are sub-cultured from the working cultures onto solid media before use.

Not applicable for viruses



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Schedule for Subculture of Stock Cultures							
Isolate #	Isolate	Sub monthly from freezer	Sub monthly to slants	Sub weekly from slants	Sub weekly from plates	Sub Mon/ Wed /Fri	Sub Mon/Fri
1	<i>Enterococcus gallinarum</i> 49573	X	X	X			
2	<i>Enterococcus faecalis</i> 49532	X	X	X			
3	<i>Enterococcus faecalis</i> 49533	X	X	X			
4	<i>Staphylococcus aureus</i> 8610	X	X	X			
5	<i>Staphylococcus aureus</i> 43300	X	X	X			
6	<i>Staphylococcus aureus</i> 43387	X	X	X			
7	<i>Klebsiella pneumoniae</i> 13883	X	X	X			
8	<i>Klebsiella pneumoniae</i> CAP 98	X	X	X			
9	<i>Proteus mirabilis</i> 12453	X	X	X			
10	<i>Proteus vulgaris</i> 13315	X	X	X			
11	<i>Escherichia coli</i> 0157 700728	X	X	X			
12	<i>Staphylococcus lugdenensis</i> 700328	X	X	X			
13	<i>Staphylococcus epidermidis</i> 12228	X	X	X			
14	<i>Staphylococcus aureus</i> 25923	X	X	X			
15	<i>Staphylococcus aureus</i> 29213	X	X	X			
16	<i>Staphylococcus saprophyticus</i> 15305	X	X	X			
17	<i>Escherichia coli</i> 35218	X	X	X			
18	<i>Escherichia coli</i> 25922	X	X	X			
19	<i>Pseudomonas aeruginosa</i> 27853	X	X	X			
20	<i>Enterococcus faecalis</i> 29212	X	X	X			
21	<i>Enterococcus faecalis</i> 51299	X	X	X			
22	<i>Moraxella catarrhalis</i> 8176 CO <sub>2</sub>	X			X		
23	<i>Streptococcus agalactiae</i> 12386 CO <sub>2</sub>	X			X		
24	<i>Streptococcus pyogenes</i> 19615 CO <sub>2</sub>	X			X		
25	<i>Streptococcus sanguis</i> 105556 CO <sub>2</sub>	X			X		
26	<i>Streptococcus</i> Group F 12392 CO <sub>2</sub>	X			X		
27	<i>Leuconostoc</i> species. CO <sub>2</sub>	X			X		
28	<i>Haemophilus influenzae</i> 49427 CO <sub>2</sub> CHOC	X			X		
29	<i>Haemophilus parainfluenzae</i> 7901 CO <sub>2</sub> CHOC	X			X		
30	<i>Haemophilus influenzae</i> B-lac+ 35056 CO <sub>2</sub> CHOC	X			X		
31	<i>Haemophilus influenzae</i> B-lac+ 35056 CO <sub>2</sub> CHOC	X			X		

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Schedule for Subculture of Stock Cultures							
Isolate #	Isolate	Sub monthly from freezer	Sub monthly to slants	Sub weekly from slants	Sub weekly from plates	Sub Mon/ Wed /Fri	Sub Mon/Fri
32	<i>Streptococcus pneumoniae</i> 49619 CO <sub>2</sub>	X			X		
33	<i>Streptococcus pneumoniae</i> 6303 CO <sub>2</sub>	X			X		
34	<i>Neisseria gonorrhoeae</i> 3069 CO <sub>2</sub> CHOC	X				X	
35	<i>Streptococcus equinus</i> C 9528 CO <sub>2</sub>	X			X		
36	<i>Streptococcus equinus</i> G 12394 CO <sub>2</sub>	X			X		
37	<i>Campylobacter jejuni</i> 29428 Microaerophilic	X				X	
38	<i>Shigella boydii</i> 9207	X	X				
39	<i>Shigella flexneri</i> 12022	X	X				
40	<i>Shigella sonnei</i> 25931	X	X				
41	<i>Shigella dysenteriae</i> 13313	X	X				
42	<i>Yersinia enterocolitica</i> 27729	X	X				
43	<i>Candida albicans</i> 10231	X	X				
44	<i>Candida tropicalis</i> 13803	X	X				
45	<i>Salmonella typhi</i> 19430	X	X				
46	<i>Bacteroides fragilis</i> 25285 ANO <sub>2</sub>	X					X
47	<i>Salmonella paratyphi</i> 9150	X	X				
48	<i>Escherichia coli</i> 51446	X	X	X			
49	<i>Clostridium sordellii</i> 9714 ANO <sub>2</sub>	X					X
50	<i>Staphylococcus aureus</i> 977	X	X	X			
51	<i>Staphylococcus aureus</i> 1026	X	X	X			
52	<i>Staphylococcus aureus</i> 976	X	X	X			
53	<i>Staphylococcus aureus</i> 700699	X	X	X			
54	<i>Staphylococcus aureus</i> 700698	X	X	X			
55	<i>Klebsiella pneumoniae</i> 1706	X	X	X			
56	<i>Klebsiella pneumoniae</i> 1705	X	X	X			
57	<i>Escherichia coli</i> N10-505	X	X	X			
58	<i>Escherichia coli</i> 8739	X	X	X			
59	<i>Enterococcus faecium</i> Vanc R	X	X	X			
60	<i>Klebsiella pneumoniae</i> String test +	X	X	X			
61	<i>Enterobacter aerogenes</i> ATCC 13048	X	X	X			
62	<i>Candida glabrata</i> ATCC MYA-2950	X	X	X			

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## CULTURE MEDIA QUALITY CONTROL

### PROCEDURE FOR QC ON COMMERCIALY PREPARED MEDIA:

All prepared media received will be examined visually for colour change, precipitate, lysis of blood, contamination etc. Any atypical observation should be brought to the attention of the QA technologist. An [incident report form](#) will then be filled out and faxed to the supplier.

Performance quality control testing for routine commercially prepared media is not required except as per [Media Requiring QC Table](#).

See [media](#) and [reagent](#) for quantity to select for QC bench for registration and QC when received.

Keep signed packing slip in the designated binder. Certificate of Analysis are online when needed. See manufacturer website for certificate.



MEDIA REQUIRING QC	
Aesculin Agar W/ Chloramphenicol, Gentamicin (EBM)	Decarboxylase + Ornithine Broth
All Homemade Media	Haemophilus Selective Agar
BHI Agar	Haemophilus Test Medium Agar
BHI Agar W/ ccg W/ 5% Sheep Blood	Macconkey Agar With 2 µg /mL Cefpodoxime
BHI Agar W/ Casein	Macconkey Agar With Colistin CTCZ
BHI W/ Gent 500, BHI W/ Strep 2000	Macconkey Agar Sorbitol
BHI Agar W/ 6 mcg Vancomycin	Martin Lewis Agar
Bile Esculin Plate	Mueller Hinton Agar
Campylobacter Agar	Mueller Hinton Agar W/ 4% Salt
Carrot Broth	Mueller Hinton Agar W/ 4% Salt, 6 mcg Oxacillin
Chocolate Agar	Motility Tubes
Chromogenic Brilliance VRE Agar	MR-VP
Chromogenic MRSA Denim Blue Agar	Reasoners 2A (R2A)
Chromogenic Urine Biplate	Visa Isolation Agar
Decarboxylase Base Broth	GMP media - Annually

1. Create testing labels for any of the above media. See hyperlink referring to [Printing QC Labels](#). Go to the receiving worklist "QC Media on receipt". Assemble the media to be tested and use the template for "[Plate Media QC'd On Receipt](#)", to wand label barcodes to

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the appropriate organisms for each media. Labels will print in the order that you want them.



(Note: If you have more than 1 lot number for a particular media type, you will have to exit the receiving list after ordering the labels for the first lot and re-enter the work list for each subsequent lot.)

2. Register each item into the “micqc” module of the LIS. See Appendix VI - [SOFT FOR MICQC](#).
3. For **Oxacillin, NAACL, VISA, BHI with casein, VANCO, and High level Gent/Strep. plates,**
  - i. QC must also be done each day the plate is used. Test QC organisms on each plate as they are set up with clinical isolates. LIS VITEK QC worklist will generate testing requirements as scheduled.
  - ii. **Print a bar-code registration label for each plate received by doing the following:**
    - Upon receipt of these media, go to micqc registration.
    - Choose Media.
    - A (add)
    - Choose correct media under media id.
    - Type in the lot number.
    - If the lot has been received previously, add a letter “A” on the end of the number. If this lot has also been received previously, try “B” etc.
    - Put in the expiry date.
    - Enter. Enter. F9.
    - Choose a label printer.
    - For number of copies, choose the number of plates for the lot number you are receiving.
    - **Put the labels in a poly-bag and place the plates and their respective labels in wire wrack in the walk-in refrigerator (MIRM2). Be sure to put newest lots to the back of the shelf and move older lots forward.**
4. Using the testing labels generated, label a saline tube for suspensions of each organism required, and affix one label to the media being tested and another label for 1 representative purity plate for each organism.
5. For all isolates except *N. gonorrhoeae*, *H. influenzae* and *C. jejuni*:  
Prepare a saline suspension of all required isolates to a turbidity to match 0.5 McFarland Standard. Inoculate media using a calibrated 1µL (0.001 mL) loop. Incubate as required and inspect cultures at 24 and 48 hours.



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6. For *N. gonorrhoeae*, *H. influenzae* and *C. jejuni*:  
Prepare a saline suspension of all required isolates to a turbidity to match 0.5 McFarland Standard. Make a 1:10 dilution; remove 300ul from a standard blank Vitek saline tube (3.0mL) and pipette 300uL of the 0.5 McFarland suspension into the saline.
7. Inoculate media using a calibrated 1µL (0.001 mL) loop. For Oxacillin Screen, QUAD and Vancomycin Screen plates inoculate with a swab.
8. Incubate as required and inspect cultures at 24 and 48 hours.
9. Record as “OK” in the LIS if correct result is obtained. Put the product into circulation. See [Organisms for Media QC and Expected Results](#) table below for correct results.
10. If expected results are not attained, follow [Out of Range Results](#) Section

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ORGANISMS FOR MEDIA QC AND EXPECTED RESULTS		
MEDIA	ORGANISMS	EXPECTED RESULTS
AESCULIN AGAR W/ CLORAMPHENICOL, GENTAMICIN (EBM)	<i>C. neoformans</i> ATCC 76484	Brown
	<i>C. glabrata</i> ATCC 2001	Clear
	<i>E. coli</i> ATCC 25922	No growth
BHI AGAR	<i>E. faecalis</i> ATCC 49532	Growth
	<i>E. faecalis</i> ATCC 49533	Growth
	<i>E. gallinarum</i> ATCC 49573	Growth
BHI AGAR W/ CCG/5% SHEEP BLOOD	<i>T. mentagrophytes</i> patient strain 9533	Growth
	<i>C. albicans</i> ATCC 10231	Growth
	<i>E. coli</i> ATCC 25922	No growth
BHI AGAR W/ CASEIN	<i>S. aureus</i> ATCC 8610	Growth
	<i>S. aureus</i> ATCC 43300	Growth
	<i>S. aureus</i> ATCC 29213	Growth
	<i>S. aureus</i> ATCC 43387	Growth
BHI AGAR W/ GENT 500, BHI W/ STREP 2000	<i>E. faecalis</i> ATCC 49532	Gent-Growth Strep-No growth
	<i>E. faecalis</i> ATCC 49533	Gent-No growth Strep-Growth
	<i>E. gallinarum</i> ATCC 49573	Gent-No growth Strep-No Growth
BHI AGAR W/ 6 MCG VANCO	<i>E. faecalis</i> ATCC 49532	No growth
	<i>E. faecalis</i> ATCC 49533	No growth
	<i>E. gallinarum</i> ATCC 49573	Growth
BILE ESCULIN PLATE	<i>E. faecalis</i> ATCC 25912	Black

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ORGANISMS FOR MEDIA QC AND EXPECTED RESULTS		
MEDIA	ORGANISMS	EXPECTED RESULTS
	<i>S. pyogenes</i> ATCC19615	No growth
* Use the 1:10 dilution of the 0.5 McFarland suspensions for inoculation.		
CAMPYLOBACTER AGAR	<i>Campylobacter jejuni</i> ATCC 29428*	Growth
	<i>E. coli</i> ATCC 25922	No growth
CARROT BROTH	<i>S. agalactiae</i> ATCC 12386	Orange + growth
	<i>S. pyogenes</i> ATCC 19615	No colour + Growth
	<i>E. coli</i> ATCC 25922	No colour + No growth
CHOCOLATE AGAR	<i>N. gonorrhoeae</i> ATCC 43069*	Growth
	<i>H. influenzae</i> ATCC 10211*	Growth
CHROMOGENIC BRILLIANCE AGAR (VRE)	<i>E. faecalis</i> ATCC 51299	Blue colonies
	<i>E. gallinarum</i> ATCC 49573	No growth
	<i>E. faecalis</i> ATCC 29212	No growth
	<i>E. coli</i> ATCC 25922	No growth
	<i>C. albicans</i> ATCC 10231	No growth
CHROMOGENIC DENIM BLUE AGAR	<i>E. faecium</i>	Purple colonies
	<i>S. epidermidis</i> ATCC 12228	No growth
	<i>S. aureus</i> ATCC 43300	Blue colonies
	<i>S. aureus</i> ATCC 29213	No growth
	<i>S. aureus</i> LPTP 8610	Blue colonies
	<i>E. coli</i> ATCC 25922	No growth
CHROMOGENIC URINE BIPLATE	<i>E. faecalis</i> ATCC 29212	No growth
	<i>E. coli</i> ATCC 25922	Burgandy pink
	<i>P. vulgaris</i> ATCC 13315	Brown
	<i>S. aureus</i> ATCC 25923	White

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ORGANISMS FOR MEDIA QC AND EXPECTED RESULTS		
MEDIA	ORGANISMS	EXPECTED RESULTS
DECARBOXYLASE BASE BROTH	<i>S. lugdunensis</i> ATCC 170032	Yellow
	<i>S. aureus</i> ATCC 25923	Yellow



\* Use the 1:10 dilution of the 0.5 McFarland suspensions for inoculation.

DECARBOXYLASE + ORNITHINE BROTH	<i>S. lugdunensis</i> ATCC 170032	Purple
	<i>S. aureus</i> ATCC 25923	Yellow
HAEMOPHILUS SELECTIVE AGAR	<i>S. aureus</i> ATCC 29213	No growth
	<i>H. influenzae</i> ATCC 10211*	Growth
HAEMOPHILUS TEST MEDIUM AGAR	<i>H. influenzae</i> ATCC 494227	Ampicillin 13-21mm Ceftriaxone 31-39mm
	<i>H. influenzae</i> ATCC 10211	Growth
MACCONKEY AGAR W/ 2 µG/ML CEFPODOXIME	<i>K. pneumonia</i> Cap 98D	Growth
	<i>K. pneumonia</i> ATCC 13883	No growth
MACCONKEY AGAR W/ COLISTIN CTCZ	<i>S. marcescens</i> ATCC 12820	Growth
	<i>E. coli</i> ATCC 25922	No growth
MACCONKEY AGAR SORBITOL	<i>E. coli</i> ATCC 25922	Pink
	<i>E. coli</i> LPTP 0157:H7 8608-3	Colourless
MARTIN-LEWIS AGAR	<i>N. gonorrhoeae</i> ATCC 43069*	Growth
	<i>P. mirabilis</i> ATCC 12453	No growth
	<i>S. epidermidis</i> ATCC 12228	No growth
MUELLER HINTON AGAR WITH GENTAMICIN 10µg DISC	<i>P. aeruginosa</i> ATCC 27853	16-21 mm zone
MUELLER HINTON AGAR WITH TMP/SMX DISC	<i>E. faecalis</i> ATCC 29212	≥20 mm zone
MUELLER HINTON AGAR	<i>S. aureus</i> ATCC 8610	Growth

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ORGANISMS FOR MEDIA QC AND EXPECTED RESULTS		
MEDIA	ORGANISMS	EXPECTED RESULTS
W/4% SALT 6 mcg OXACILLIN	<i>S. aureus</i> ATCC 43300	Growth
	<i>S. aureus</i> ATCC 29213	No growth
	<i>S. aureus</i> ATCC 43387	No growth / Haze



\* Use the 1:10 dilution of the 0.5 McFarland suspensions for inoculation.

MUELLER HINTON AGAR W/ 4% SALT	<i>S. aureus</i> ATCC 8610	Growth
	<i>S. aureus</i> ATCC 43300	Growth
	<i>S. aureus</i> ATCC 29213	Growth
	<i>S. aureus</i> ATCC 43387	Growth
MOTILITY TUBES	<i>E. coli</i> ATCC 25922	Positive
	<i>K. pneumo</i> ATCC 13883	Negative
MR-VP	<i>S. pyogenes</i> ATCC19615	Negative
	<i>S. Gp. F</i> ATCC 12392	Positive
PYRUVATE AGAR	<i>N. brasiliensis</i> (patient) 19296	Growth
	<i>E. coli</i> ATCC 25922	No Growth
Reasoners 2A (R2A) Agar	<i>S. aureus</i> ATCC 25923	Growth
	<i>E.coli</i> ATCC 25922	Growth
VISA ISOLATION AGAR	<i>S. aureus</i> LPTP 8610	Growth
	<i>S. aureus</i> ATCC 43300	Growth
	<i>S. aureus</i> ATCC 29213	No growth
	<i>E. gallinarum</i> ATCC 49573	Growth
<b>GMP Media - Annual QC required:</b>		
THIOGLYCOLATE BROTH	<i>S. aureus</i> ATCC 6538	Growth
	<i>P. aeruginosa</i> ATCC 9027	Growth

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ORGANISMS FOR MEDIA QC AND EXPECTED RESULTS		
MEDIA	ORGANISMS	EXPECTED RESULTS
TRYPTICASE SOYA BROTH	<i>C. sporogenes</i> ATCC 19404	Growth
	Uninoculated	No growth
	<i>B. subtilis</i> ATCC 6633	Growth
	<i>C. albicans</i> ATCC 10231	Growth
	<i>A. brasiliensis</i> ATCC 16404	Growth
	Uninoculated	No growth

\* Use the 1:10 dilution of the 0.5 McFarland suspensions for inoculation.

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## PROCEDURE FOR QC ON MEDIA PREPARED IN-HOUSE:

Visual inspection includes observing the media for colour change, precipitate, lysis of blood, etc. Any atypical observation should be brought to the attention of the QA technologist. If the medium is visually satisfactory, write "OK" in the space provided.



pH testing will be performed on the final medium after it has solidified and cooled to room temperature. Record the value obtained in micqc Results Entry List "Procedure Actions" Comment (F7).

For blood that has been added to freshly prepared agar, one drop is put onto BA and incubated at 35°C for 48 hours and then at RT for a further 48 hours.

Sterility testing will be performed on all media prepared in our laboratory. One plate or tube from each batch will be incubated at 35°C for 48 hours, one at room temperature for 48 hours. Performance testing will be done using the Standard Loop method. One plate from each batch will be tested when first prepared and again on each successive 7 days until the supply in the refrigerator is depleted or the expiry date is reached.

If expected results are not attained, follow [Out of Range Results](#) Section

Results will be documented in LIS.

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## ANTIBIOTIC QUALITY CONTROL

Antibiotics are tested weekly on the QC bench. LIS VITEK QC worklist will generate testing requirement on scheduled day. See [FREQUENCY OF TESTING](#) for further QC frequency.

For a Complete list of antibiotic inventory see: [Purchasing and Inventory](#) forms

[Rarely used antibiotics](#) must be run with controls per use and documented on the Rarely Used Antimicrobial Recording Chart in [Appendix VIII](#).

### PROCEDURE:

#### A. LOT REGISTRATION

All new lots of antibiotics and E-tests must be registered into the QC program. All antibiotics and E-tests will be given to the QC bench on receipt. For shipments requiring registration follow [Appendix VII: Registering Antibiotics](#).

#### B. CONTROL STRAIN PREPARATION



- To control the precision and accuracy of the test procedure, the following organisms are to be maintained:

<i>Staphylococcus aureus</i>	ATCC 25923
<i>Staphylococcus aureus</i>	ATCC 29213
<i>Staphylococcus aureus</i>	ATCC 700698
<i>Staphylococcus aureus</i>	ATCC 700699
<i>Staphylococcus epidermidis</i>	ATCC 12228
<i>Staphylococcus saprophyticus</i>	ATCC 15305
<i>Enterococcus faecalis</i>	ATCC 29212
<i>Streptococcus pneumoniae</i>	ATCC 49619
<i>Escherichia coli</i>	N10-505
<i>Pseudomonas aeruginosa</i>	ATCC 27853
<i>Klebsiella pneumoniae</i>	ATCC 1705
<i>Klebsiella pneumoniae</i>	ATCC 1706
<i>Haemophilus influenzae</i>	ATCC 49247
<i>Haemophilus influenzae</i>	ATCC 10211
<i>Neisseria gonorrhoeae</i>	ATCC 49226

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2. Before testing, cultures are subcultured from the TSB working culture slants to Blood agar.  
Note: (*Haemophilus* is subcultured once per week from Chocolate agar and stored at 4C).
3. Continue to use these cultures as long as there is no significant change in the mean value diameter that cannot be attributed to methodology. Obtain fresh cultures from the ATCC or any reliable commercial source.
4. Follow procedure described in the Antibiotic Susceptibility section of the lab manual.

#### C. ANTIBIOTICS TO BE TESTED

Test the control organisms using the antimicrobial discs/ Etests which are used to test clinical isolates. The discs/ Etests currently in use and the appropriate organisms for testing are listed in tables for: [Kirby Bauer Disk QC](#), [ROSCO Disks QC](#) and [Etest QC](#).

1. See [Antimicrobial Abbreviations](#) in susceptibility manual for antibiotic codes. The stock supply of discs is found in freezer MIFA. The working racks of discs/ Etests are placed in the freezer each night. When replacing a vial from the stock supply, write the date in use on the vial. Note: There is also a rack labelled “Rarely Used Antibiotics” in MIFA.
2. The disks/ Etests on the working discs rack are tested for Quality Control weekly and the “Rarely Used Antibiotics” are tested for Quality Control whenever patient test is done.
3. Each new batch of Mueller Hinton agar must be tested for unsatisfactory levels of inhibitors. This is done by performing the tests with *E. faecalis* (ATCC 29212) and sulfonamide and trimethoprim/sulfamethoxazole (co-trimoxazole) discs.

#### D. ZONE SIZE / MIC LIMITS

Enter zone diameters into the LIS KB-QC charts. Maximum and minimum zone diameters/ MIC that should be observed with a single control test can be found in MICQC as well as CLSI M100 .

- (a) No more than one out-of-control result in 20 consecutive control tests is allowed. Any more than this requires corrective action.
- (b) Anytime corrective action is taken the count of 20 begins again.



#### E. FREQUENCY OF TESTING

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1. Each new lot of Mueller Hinton agar must be tested and documented.
2. Each new type of antimicrobial discs/Etests must be tested with appropriate control strains before being introduced into routine use. Preferably this will be done when the discs arrive in the laboratory.
3. The overall performance of the procedure should be monitored daily. Weekly monitoring will be done in this laboratory provided that the following conditions exist:
  - (a) Documentation that the control strains were tested for 30 consecutive test days
  - (b) No more than 3 of the 30 zone diameters were outside the accuracy control limits stated in Table 2.

When these requirements are fulfilled, each control strain must be tested:

- (i) Once a week
- (ii) Whenever any reagent component is changed.

4. M2 / M7 CLSI If any zone diameter is outside the control limit when tested weekly, you must return to daily testing until the problem is resolved. If resolution of the problem cannot be resolved, you must continue daily control tests. To return to weekly testing, documentation of satisfactory performance for another 30 consecutive days must be done.

#### F. RESOLUTION OF THE PROBLEM

1. Resolution of any problem must be documented in the LIS as a "Procedure Comment" or "Result Comment".
2. Inform QA or charge technologist of all out-of-range results.
3. See CLSI M100 Table 3D- Disc Diffusion QC Troubleshooting Guide for corrective action suggestions.
4. Corrective Action during Daily Testing.
  - (a) One out-of-control measurement is not cause for immediate attention.
  - (b) Corrective action must be taken if any of the following circumstances arise:



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- (i) 2 consecutive measurements of any drug-microorganism combination fall outside the range
- (ii) 3 or more in 20 consecutive test results fall outside the range

5. Corrective Action during Weekly Testing.

If a value falls outside the accuracy control/limits, the following are required:

- (a) Appropriate control strain(s) must be tested for 5 consecutive test days.
- (b) For each drug-microorganism combination, all 5 zones must be within the accuracy control limits.
- (c) If any result is outside the accuracy or precision control limits, daily control testing must be resumed for a minimum of 30 consecutive test days.



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<b>ANTIBIOTICS TO BE TESTED FOR KIRBY BAUER QC – 0.5 McFarland</b>					
<b>KB Disk Abbreviation</b>	<i>S. aureus</i> ATCC 25923	<i>E.coli</i> ATCC 25922	<i>P.aeruginosa</i> ATCC 27853	<i>H.influenzae</i> ATCC 49427	<i>S.pneumoniae</i> ATCC 49619
	3 small MH	2 large MH	2 small MH	1 HTM	1 MH Blood
	BA PP	MAC PP	MAC PP	CHOC PP	BA PP
LEV					X
E	X				X
OX	X				X
DA	X				X
VA	X				X
CN	X	X	X		
KZ	X	X			
P	X				
SXT	X	X			
TE	X	X			
RD	X				
MUP	X				
AM		X		X	
CRO/CAX		X		X	
F		X			
TOB		X	X		
CAZ		X	X		
CP		X			
MEM		X			
AMC		X			
ATM		X			
CPD		X			
FOX		X			
FEP		X			
ETP		X			
AMK			X		
TZP			X		

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<b>ANTIBIOTICS TO BE TESTED FOR KIRBY BAUER QC – 0.5 McFarland</b>			
<b>KB Disk Abbreviation</b>	<i>S.epidermidis</i> ATCC 12228	<i>S. saprophyticus</i> ATCC 15305	<i>H.influenzae</i> ATCC 49427
	1 small MH	1 small MH	
	BA PP	BA PP	CHOC PP
NV	X	X	
Growth			X

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ROSCO DISKS TO BE TESTED FOR QC AND EXPECTED RESULTS			
KB Disk Abbreviation	<i>K. pneumoniae</i> ATCC 1705	<i>K. pneumoniae</i> ATCC 17056	<i>E coli</i> N10-505
	1 large MH	1 large MH	1 large MH
	Set up plates using 0.5 McFarland Suspensions with MAC PP		
Meropenem 10	15 – 20 mm	28 – 35 mm	11 – 16 mm
Mero10+DP	15 – 20 mm	28 – 35 mm	25 – 30 mm
Mero10+BO	22 – 28 mm	28 – 35 mm	11 – 16 mm
Mero10+CL	15 – 22 mm	28 – 33 mm	11 – 16 mm
Temocillin	12 – 35 mm	12 – 35 mm	9 – 11 mm
Differential Characteristic	DP<5, <b>BO</b> ≥5, CL <5 mm TEMO=S	DP<5, BO<5, CL<5 mm TEMO=S	<b>DP</b> ≥5, BO<5, CL <5 mm TEMO=R

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ANTIBIOTICS TO BE TESTED FOR Etest QC – 0.5 McFarland						
Etest Disk Abbreviation	<i>S. aureus</i> ATCC 29213	<i>E. coli</i> ATCC 25922	<i>P. aeruginosa</i> ATCC 27853	<i>E. faecalis</i> ATCC 29212	<i>S. pneumoniae</i> ATCC 49619	<i>N.gonorrhoeae</i> ATCC 49226*
	6 small MH	2 small MH	3 small MH	1 small MH	2 MH Blood	1 GC Agar
	BA PP	MAC PP	MAC PP	BA PP	BA PP	CHOC pp
VA	X				X	
P	X				X	X
MUP	X					
FU	X					
TP	X					
LZ	X					
QDA	X					
LE	X					
CT	X					
C/T			X			
PO			X			
CO			X			
PTc			X			
ETP		X				
PRL			X			
TX	X				X	X
TGC		X		X		
TS		X				
TZ	X					



\*for GC use 0.5 McFarland in MH Broth

ANTIBIOTICS TO BE TESTED FOR Etest QC – 2.0 McFarland			
Etest Disk Abbreviation	<i>S. aureus</i> ATCC 29213	<i>S. aureus</i> ATCC 698	<i>S. aureus</i> ATCC 699
	1 BHI Casein	1 BHI Casein	1 BHI Casein
	BA PP	BA PP	BA PP
VA	X	X	X
TP	X	X	X

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## REAGENT AND TEST KITS QUALITY CONTROL

### REGISTRATION OF REAGENT AND TEST KITS:

**Date** all reagents and test kits **on receipt**. Register them into LIS and leave the "Active" flag as "N" if the reagent or test kit is not being used immediately.

When reagent or test kit is being placed for use, **date** the **in-use** vial with the date it is opened. If this is a new lot, change the LIS the "Active" flag to "Y" and change the previous lot "Active" flag to "N".

### FREQUENCY OF TESTING:

All required QC for reagents and test kits will be alerted to the technologist by the LIS when working up through bench WORKLIST.



### On Receipt QC:

Acridine orange	James
ALA discs	Kovacs
API 20E strips	LAP discs
API 20NE strips	Optochin
API NH strips	Oxidase droppers
βCARBA	Phadobact kit
βLACTA	PYR kits
Bacitracin discs	Rosco
Catalase (hydrogen peroxide)	Saline (3ml & 0.5mL)
Cefinase discs	Salmonella serology
Cryptococcal Antigen Latex kits	Shigella serology
DENKA kits	Staph-Plus Pastorex kits
Desoxycholate (Bile solubility) droppers	Strep group Prolex Reagents 1,2,3, ABCDFG
E. coli O157 Test kits	Tributyryn discs
Eosinophil Stain	Tube coagulase
FAB broth	TREK panels
Ferric Chloride	VITEK cards
Fungi flour stain	Welcolex
Horse serum	ZN Stain kits: Kinyouns, Modified Kinyouns and Auramine Rhodamine
Indole spot reagent	

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**PROCEDURE:**

Perform QC on test kits and reagents as described in the technical manuals.

For kits which require freshly subcultured control organisms to be QC namely API, Rapid ANA, and Vitek cards:

In SOFT, 1 (Receiving Work List)

F5 (marking)

Using the “Kit QC on Receipt” template, wand the appropriate organisms for each type of Kit to be QC.

F7

R

Choose a label printer. Enter.

Labels can be used for subculture of organisms from freezer stocks, the test itself, API/ Rapid ANA code sheets, and purity plates as required.

For kits that have their own internal controls, follow procedure described in the Technical section of the lab manual. Enter the results into the LIS.

If expected results are not attained, follow [Out of Range Results](#) Section



**Saline sterility testing:**

For 3ml & 0.5mL saline tubes only.

Each batch of saline received must be tested for sterility. Two saline tubes from each box must be tested.

- Mark the salines to trace them back to their respective boxes
- Label one BA for each saline
- Remove 1mL from each saline to inoculate onto the BA
- Incubate as below for a total of 48hours
- Report growth or no growth for the entire shipment received

<b>Media</b>	<b>Incubation</b>
Blood Agar (BA)	CO <sub>2</sub> , 35°C x 24 hours O <sub>2</sub> RT °C x 24 hours

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**F.A.B sterility testing:**

Each batch of Fastidious Anaerobic Broth received must be tested for sterility.  
Two FAB tubes must be tested from each box received.

- Mark the FAB tubes to trace them back to their respective boxes.
- Incubate as below for a total of 4 days.
- Report growth or no growth for the entire shipment received.

Media	Incubation
Fastidious Anaerobic Broth (THIO)	CO <sub>2</sub> , 35°C x 48 hours
	O <sub>2</sub> RT °C x 48 hours



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## EQUIPMENT MAINTENANCE & QUALITY CONTROL

For Equipment Maintenance refer to [Equipment Maintenance Procedure QEQMI03001](#)

### Anaerobic Jars

Match the label of the jar and the lid.

Include the following in each anaerobic jar set up:

QC Item	Expected Result:
Anaerobic Indicator strip (OXOID)	Colourless within 2 hours of set up and remains colourless until the jar is opened
<i>P. aeruginosa</i> *	No growth
<i>B. fragilis</i> *	Growth
<i>C. sordelli</i> *	Growth

Enter results into Softmicqc.

\* Not required for 24 hours throat culture jars.

If expected results are not attained, follow [Out of Range Results](#) Section

### Campylobacter Jars

Match the label of the jar and the lid.

Include the following in each anaerobic jar set up:


QC Item	Expected Result:
<i>C. jejuni</i>	Growth

Enter results into Softmicqc.

Records of all preventive maintenance and repair work performed by maintenance companies are filed in each of the equipment binders.

Set up QC after each preventive maintenance work performed.

If expected results are not attained, follow [Out of Range Results](#) Section

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### SEROLOGY / VIROLOGY QC



All new reagents lots will be tested using samples and/or commercially available reference material (where available) before being placed in service.

All Serology tests require QC run in parallel with each clinical sample test run. Refer to the appropriate tests for procedure and method.

See [Serology Manual](#) and [Molecular Diagnostic Test Manual](#).

Record all QC results into the LIS or spreadsheets.

If expected results are not attained, follow [Out of Range Results](#) Section

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## QUALITY CONTROL REVIEW

Inform all out-of range results to the Charge Technologist, Senior Technologist or Quality Assurance Technologist.

Charge technologists are responsible for reviewing overdue Quality Control procedures **weekly** with responsible bench technologists.

Obtain lists of overdue QC procedures from the LIS - micqc program:

From micqc main menu

1. go to 1-Tasks
2. select "Results Verification"
3. select from pick list "Bacteriology QC Pending List", "QC Pending List", "Virology QC Pending List" or "VITEK Bench QC Pending List".
4. F12
5. F6 to print list
6. Select printer from printer list



Charge technologist, Senior Technologist or Quality Assurance Technologist will verify all Quality Control results **weekly**. All procedures will be verified on-line.

- Obtain lists for verification from the LIS - micqc program:
  - From micqc main menu
  - 1. go to 1-Tasks
  - 2. select "Results Verification"
  - 3. select from pick list "Bacteriology Verification List", "Heating Block Verification List" or "Virology Verification List".
  - 4. Press "enter"
  - 5. F12
  - 6. Press F6 on the procedure line
    - If there are abnormal results, follow Steps 7 and 8. If there is no abnormal results continue to Step 9
  - 7. F7 to review action if there are abnormal results
  - 8. F5 to add new comment/action if needed
  - 9. F8 to verify all
  - 10. F12
  - 11. "y" to confirm editing
  - 12. Repeat steps 6 to 11 for further procedures.
  - 13. F1 to exit when done.
- For Serology tests, QC verifications are done on worksheet for each assay of each run and documented in the LIS (see LIS Manual section for procedure).

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The Laboratory Supervisor will perform **Monthly** review of all Quality Control procedures.

- Print the list of abnormal results from LIS-micqc:
  - From micqc main menu
    1. go to 1-Tasks
    2. select “Abnormal Res. Rep.”
    3. select from pick list “monthly Abnormal Log”
    4. F12
    5. F7 for report printing
    6. Select printer from printer list
    7. Sign and file this report in the QC Review folder.
  
- Review on-line all QC procedures from LIS-micqc:
  - From micqc main menu
    1. go to 1-Tasks
    2. select “Results Verification”
    3. F2
    4. select from pick list “Supervisor Monthly Verification List”
    5. F12
    6. F7 for report
    7. Select "View" from printer list. Wait for 1 minute.
    8. Scroll down list to review
    9. "M" then use down arrow to mark a few lines.
    10. "P" to print the marked page
    11. Select printer from printer list
    12. Sign the printed page and file it in the QC Review folder.
  
- For Serology procedures QC:
  1. Log on to **qc**
  2. **1.** Result
  3. Result **M**aintenance
  4. **D**isplay
  5. **F2** to list instruments, arrow down to select: MON; VD or VZ
  6. **Enter** to select (asterisk)
  7. **F12**
  8. **F2** to list tests (8CMS, 8HAB....8VD, 8VZ)
  9. **Enter** to select (asterisk)
  10. **F12**



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11. **F2** to display QC lots (also displays expiratory dates)  
    To print or to display more information such as QC verification:
12. **Enter** to select (asterisk)
13. **F12** to pick date range
14. **F12, F7** to print
15. **Sign this report and file it in the QC Review folder.**

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	Planting	Gram Stain	Blood Culture Accessioning	Blood Culture 1 & 2	Respiratory	Urine
<b>Daily</b>	Clean Centrifuge Biosafety Cabinet Cleaning / Pressure / Settle Plates - Resp - Gynae / Misc - IC - VRE - Urine Isoplater GeneXpert Gram Stain Instrument	Gram stain Kohler Mic1 Kohler Mic2 Kohler Mic3	Biosafety Cabinet Cleaning /Pressure/ Settle Plates Bench QC duties Vitruo Worklists Gram stain Bench Top Kohler	Vitek MS Catalase x2 Oxidase x2 Staph agglu. X2 PYR Densichek x2 Bench Top x2 Heating Block x2 Anaerobic Jar x2	Catalase Oxidase Staph agglu. Cefinase Cetrimide Heating Block Densichek Bench Top x2 Anaerobic Jar x2	Catalase Oxidase Staph agglutination Densichek x2 Bench Top x2 <b>From Planting QC:</b> Isoplater Reader WASP settle plates WASP sterility plates
<b>Weekly</b>	GeneXpert Isoplater Maintenanance		Weekly Checklist	Weekly Checklist - BC1 Weekly Checklist - BC2	Weekly Checklist Weekend Reminders	Weekly Checklist UR1 Weekly Checklist UR2
<b>Monthly</b>	GeneXpert					
<b>Bi-Annual</b>			Freezer MIFF Cleaning			
<b>When use</b>		Eosinophil stain ZN Modified ZN Acridine Orange FA Stain (AFB)	Acridine Orange	Ornithine Germ Tube LAP Acridine Orange String Test Bacitracin	Germ Tube ALA Acridine Orange	Spot Indole LAP
<b>On Receipt</b>						

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	Wounds	Genitals / Enterics	Infection Control	Mycology	QC	Vitek
<b>Daily</b>	Catalase x 3 Oxidase x 3 Staph agglu.x 3 Anaerobic Jar x3 Heating Block Densichek x3 Bench top x4	Catalase Oxidase Staph agglutination Densichek Bench Top Campy Jar QC	Catalase Oxidase Staph agglutination Vitek MS Densichek x2 GeneXpert Microfuge cleaning Heating Block Water bath x2 Bench top x3	Biosafety Cabinet : Cleaning /Pressure/ Settle Plates Lacto Phenol Aniline Blue Fungi-Fluor Stain Kohler Bench Top	Densichek Sterility Heating Block x2 Attest incubator x2 Bench Top x2	Read temp Read Optics Empty Waste Room temp / humidity Densichek S. aureus 8610 sub QUAD / Ox / Vanc
<b>Weekly</b>	Weekly Checklist M1 Weekly Checklist M2 Weekly Checklist M3	Weekly Checklist	Denka GeneXpert Incubate BHI Subculture controls Freezer boxes IC3 Weekly Checklists x3	Weekly Checklist	Tributylin Optochin Bile Solubility MR-VP Blacta βCARB Bile Aesculin Weekly Checklist Wellcolex – biweekly	Eyewash Stations QUAD / Screens KB / Etest Novobiocin ID / Sensi cards Walk-in Fridge/Freezer Purified Water Count Weekly Checklist TREK Panels
<b>Monthly</b>			Waterbath Cleaning GeneXpert		Strep grouping	Bacte Serology Parts Cleaning Densichek Cleaning S. aureus 8610 sub
<b>Bi-Annual</b>			Defrost / Clean MIFR		Emergency Shower <b>Quarterly:</b> Autoclave Maintenance <b>Annually:</b> QC of GMP media (Thioglycollate / TSB)	Defrost/Clean -MIFA /-MIFC
<b>When use</b>	Germ Tube Acridine Orange String Test Ornithine	Indole	Tube Coagulase	Oxgall Agar Cornmeal Agar Calcofluore White Stain Modified ZN Stain ZN Stain Acridine Orange		Saline / Tips
<b>On Receipt</b>			Denka	Fungal Media API 20C	<a href="#">Media</a> & <a href="#">Reagents</a>	

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**OUT-OF-RANGE RESULTS:**

1. Enter "Result Comment" in the LIS.
2. Inform QA or charge technologist of all out-of-range results.
3. Repeat the testing as indicated, and verify that correct control strain(s) and materials are used
4. Suspend use of the product and repeat patient testing if applicable
5. Document results and corrective actions
6. Corrective action will be instituted as required. See CLSI M100 MIC Troubleshooting Guide for corrective action suggestions.
7. The lab will be notified through LIS e-mail if needed.



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## APPENDIX I - Bacteriology QC Bench Workflow

### Daily

1. Read and document results of Q.C. testing. Document in micqc, Tasks, result entry, F2 to scroll through the list and enter under Q.C. bench.
2. Go to walk in fridge and retrieve any media, reagents, kits, or panels that need to be QC'd. They will be found on tray on left hand side of fridge.
3. Register new media into Softmic QC following [SOFT FOR MICQC](#) instructions.
4. Prepare labels for new media as per [Printing QC Labels Procedure](#).
5. [Prepare inoculum](#) as required and set up QCs for all the new materials.
6. Subculture ATCC control strains according to [Maintenance of Isolates Schedule Table](#).
7. Perform other daily QC Bench tasks as follows

### Mondays (Tuesday if Monday is a Holiday)

#### **KB Disc and Etest Weekly QC**

1. On Thursdays, all of the necessary media and materials are assembled and labelled in advance for the following weeks QC. Everything is placed in the white QC bucket and put in the walk-in fridge on the designated QC shelf

All of the labels required to perform the tasks for weekly QC have been prepared in advance and are found in blue folder.



These can be reprinted from the links below using [Avery 5167](#) labels:

[QC weekly KB, Etest, Trek labels](#)

[QC weekly Tuesday set up, CO2 and ANO2 sub labels](#)

[QC weekly Vk 2, TSA subs labels](#)

2. Make the appropriate McFarland suspensions as per [Kirby Bauer](#) and [E-Test](#) tables.  
**Label tubes as follows:**

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For Disc diffusion and Etest
<b>14 Saline Tubes</b>
Pa. 27853
Sa. 29213
Sa 700698
Sa 700699
Ec N10-505
Kp 1706
Kp 1705
Ec. 25922
Ef 29212
Hi. 49247
Sa. 25923
Se. 12228
Ss. 15305
Sp. 49619

For Vitek 2 QC
<b>11 Saline Tube</b>
Ec. 25922
Ec. 35218
Pa. 27853
Ef 29212
Ef 51299
Sa. 29213
Sa. 29213
Ef 29212
Sa. BAA1026
Sa. BAA976
Sa. BAA977

- With the prepared suspensions, use the [Kirby Bauer](#) and [E-Test](#) tables to set up appropriate KB, e-test and ROSCO tests.
- For *H. influenzae* ATCC 10211 monitor for growth on chocolate agar only
- Set up Vitek2 cards and sub-culture purity plates. For Vitek QC set up, see [Vitek Manual](#) Quality Control Section

## Tuesdays



- Materials required:

Item	Amount
Sterile tubes	10
Vitek saline	1
MHB	1
Tributyryn	
BHI plate	2
Conical tube	2
BE	1
BA	1
Prolex kit	
Optochin	
VP reagents	

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2. Prepare the following labels as per [Printing QC Labels Procedure](#) using the “QC Tuesday Set up” receiving worklist from Softmic:

Test	Organism	Media
Bile Esculin	<i>E. faecalis</i> ATCC 29212	BE
Bile Esculin	<i>S. pyogenes</i> ATCC 19615	BE
Opt	<i>S. pneumoniae</i> ATCC 6303	BA
Opt	<i>S. sanguis</i> ATCC 10556	BA
Prolex	<i>S. pyogenes</i> (Group A) ATCC 19615	Tube
Prolex	<i>S. agalactiae</i> (Group B) ATCC 12386	Tube
Prolex	<i>S. equi ssp. equi</i> (Group C) ATCC 9528	Tube
Prolex	<i>Streptococcus</i> Group F ATCC 12392	Tube
Prolex	<i>S. equisimillis</i> (Group G) ATCC 12394	Tube
Prolex	<i>E. faecalis</i> ATCC 29212	Tube
Tributyrim	<i>M. catarrhalis</i> ATCC 8176	Tube
Tributyrim	<i>N. gonorrhoeae</i> ATCC 43069	Tube
VP	<i>Streptococcus</i> Group F ATCC 12392	Tube
VP	<i>S. pyogenes</i> ATCC 19615	Tube

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## APPENDIX II - Ordering New QC ORGANISMS in Soft

As new media, reagents, kits or methodologies are added to the list of items QC'd in Microbiology, it may be necessary to order **new** ATCC organisms for our stocks in order to test these items. First check [QC Organisms List](#) to ensure we don't already have the ATCC strain in our stock. If not, follow the instructions below for adding **new** ATCC strains to our list. Each one will be entered in Soft like a patient's specimen and then frozen in triplicate in the appropriate QC storage box. The QA technologist in charge will ask the LIS officer to change one of the "QC SPARE" MRN to the new ATCC # and then proceed as follows:

### 1. Order Entry:

- ~ Go to order entry.
- ~ MRN: (Put the ATCC number followed by the acronym ATCC) i.e. 29212 ATCC
- ~ Sex: N
- ~ Spec: X
- ~ NAME:
  - LAST:**  
Put the first letter of the genus. Then put a period. Then put the first three letters of the species, followed by the ATCC number. i.e. *E. faecalis* 29212
  - FIRST:**  
Put the ATCC number followed by the acronym ATCC. i.e. 29212 ATCC
- ~ Age: 0
- ~ Attn.ph: 00001
- ~ Clinic: QCMIC (Pt. defaults to "Q" and Depot to "A1").
- ~ Req.by: 00001
- ~ Tests ordered: (Hit the CTRL key and the letter A simultaneously) QCMIC =
- ~ Source: NONE
- ~ F6 F6 F6
- ~ Study: Enter the appropriate study. You can press the F2 key to search the QC options:

You must pick which QC study freezer box the organism will be stored under:

- QCMON Organisms are subbed monthly from the freezer and used regularly.
- QCKIT Organisms are subbed as needed from freezer and used for QC of kits.
- QCNR Organisms are ATCC strains that are used infrequently.

You may also pick a QC study if the organism will be subbed regularly:


- QCANO2 ANO2 dependant organisms are subbed Mon/Wed/Fri.
- QCCO2 CO2 dependant organisms are subbed Mon/Wed/Fri.
- QCMSC Organisms are subbed Monday.
- QCFSC Organisms are subbed Friday.

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QC SLA Organisms are subbed monthly to NA slants.

You may also pick a QC study if the organism will be used for weekly QC:

QCMSU Organisms are used on Mon. for QC of antibiotic disc, E-test.

QC TSU Organisms are used on Tue. for QC of ID discs, reagents, etc.

QC VT2 Organisms are used on Mon for QC of Vitek N-213, P-567, P-580..



You may also pick a QC study if the organism has special uses:

QC ANT Organisms are used for QC of antisera.

QC MED Organisms are used to test media that must be QC as required by CLSI

~ F12 F12 Pick a label printer.



2. Sub-culturing organisms:
  - ~ Use the labels to subculture the organism to the appropriate media.
3. Generate Freezer labels for the organisms:
  - ~ Enter in SoftStore. See [Ordering New QC ORGANISMS in Soft](#) procedure for entering ATCC strains into SoftStore.
4. Enter freezer vial location into Softmic work card:
  - ~ On the back of the Softmic work card F9. FRZ F9 COM F12
  - ~ Enter the appropriate freezer information by wandng the freezer labels
  - ~ Enter the item(s) that this particular organism is used for under COM (i.e. KB/ MUG)
  - ~ Enter the accession number(s) of duplicates of this ATCC strain if they have been generated for QC of other items. Refer to these as clones (i.e. clone is G0262007 for Denim Blue)
5. Update -[QC Organisms List](#).

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### APPENDIX III - Order Entry for New QC TESTS

When new media, reagents, kits or methodologies are added to the list of items QC in Microbiology *and* we already have the ATCC strain in our QC stocks, it may be necessary to reorder the strain so that the labels will reflect what the organism will be tested for. The QA technologist in charge will ask the LIS officer to release a “Spare QC” MRN and then proceed as follows:

- ~ Go to order entry.
- ~ MRN: (Put the ATCC number followed -1) If this MRN has already been used, try again with -2. Keep trying until achieving an MRN that has not been used before.
- ~ Sex: N
- ~ Spec: X
- ~ NAME:
  - LAST:
    - Put the first letter of the genus. Then put a period. Then put the first three letters of the species, followed by name of the test e.g. E.gal MGP
  - FIRST:
    - Put the ATCC number or any other information you may want visible on the label.
- ~ Age: 0
- ~ Attn.ph: 00001
- ~ Clinic: QCMIC (Pt. defaults to “Q” and Depot to “A1”).
- ~ Req.by: 00001
- ~ Tests ordered: (Hit the CTRL key and the letter A simultaneously) QCMIC =
- ~ Source: NONE
- ~ F6 F6 F6
- ~ Page down and pick the appropriate study (what the organism is being used for) i.e. QCTSU.
- ~ On the back of the soft work card F9 COMM
  - ~ Enter the item(s) that this particular organism is used for under COM (i.e. KB/ MUG) (It is not necessary to freeze this strain. You can refer to the original ATCC for location in the freezer.)



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**APPENDIX IV - Printing QC Labels Procedure**

- a) Choose **R** (receiving worklist)
- b) Choose the appropriate list \*See below for choosing the correct one.
- c) Wand the barcode from the Printing Template that indicates “From order.” Arrow up and wand the barcode that indicates “To order”. Spacebar out the “tested date”.
- d) **F12**
- e) “**a**” will mark the whole list. The labels will print in work list order. (You can use F5 and mark individually if needed. Note: When you mark individually, they will print in the order in which they were marked)
- f) **F7**
- g) **R**
- h) Choose a label printer. Press <Enter>.
- i) One label may be for the inoculum tube, one for the purity plate and one is for the actual media, or as required

There are many QC lists on the receiving work list. The ones that will be use most commonly are:

- QCCO2                                      QC CO2 S/C label      (Mon/Wed/Fri)
- QCFSC                                      QC Friday S/C label    (Fridays)
- QCMSC                                      QC Monday S/C label (Mondays)
- QCMSU                                      QC Monday setup      (KB/E-test Mondays)
- QCVT2                                      QC Vitek 2 labels      (VT2 QC Mondays)
- QCTSI                                      QC Tuesday setup      (reagents/discs Tuesdays)
- QCMON                                      QC monthly S/C label (ATCC S/C monthly)
- QCMED                                      QC media                      (on receipt)

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**APPENDIX V - Bench Quality Control Documentation in LIS**



**Bench Daily QC for Softmic**

Bench daily QC is to be done on all benches and acceptable prior to starting testing specimens. These QCs' include reading temperature(s) of the heating block(s) or instrument associated with the bench, Catalase, Oxidase, staphylococcus slide agglutination etc.

To document the QC results into the LIS, follow the steps below:

- | <u>Keystrokes</u>   | <u>Comment/Result</u>   |
|---|---|
| <b>Log on to Softmic</b>  |   |
| 1. 2  | for "Results"   |
| 2. W  | for "Worklist"  |
| 3. pick the specific bench worklist   |   |
| 4. F12  | for default order range   |
| 5. y  | to question: "Would you like to bridge to QC?"  |
| 6. F12  | at the QC item list   |
| 7. <enter>  | at specific line where QC is done<br>for Catalase, Oxidase and SS look for the lot number with your bench extension |
| 8. Enter result for each organism from keypad selection                                   |   |
| If all results entered are within expected limits, go to Step 15                          |   |
| 9. If result entered is out of range, a window for result action will show on the screen. |   |
| 10. F2  | to look for options for actions to be taken   |



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11. Pick the appropriate action. Enter code “COMM” for comment if none on the list is desired.
12. <enter> <enter> to go to the free text line
13. type in an explanation or corrective action
14. F12 to save result action
15. F12 to save QC results
16. y to answer the question “Confirm editing?”
17. Go to the next QC item(s) and repeat Steps 8 to 16
18. F12, F1 to exit QC list on completing all required QC and return to mic worklist

To enter temperatures for heating block or instrument, go to the line for the equipment



19. <enter> to go into the item
20. type in the temperature recorded e.g. 36
21. F12 to save the temperature entered
22. y to answer the question “Confirm editing?”

To exit QC worklist:

23. F1 you will be back to your bench worklist

If no more new QC is generation the rest of the day, answer the question “do you want to bridge to QC” as “N” the next time you exit and return back to the worklist.



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**B. For tests that are usually NOT associated with the “Media Comment” screen e.g. STAT ZN, Eosinophil**

**Keystrokes**

**Comment/Result**

**Log on to Softmic**

- |     |   |  |
|-----|---|--|
| 1.  | 2   | for “Results”                                      |
| 2.  | W   | for “Worklist”                                     |
| 3.  | pick the specific bench worklist            |  |
| 4.  | F12   | for default order range                            |
| 5.  | n   | to the question: “Would you like to bridge to QC?” |
| 6.  | <enter>                                     | to go into the order number for result entry       |
| 7.  | [ or <CTRL n>                               | to go to the “Media Comment” Screen                |
| 8.  | pick from the keypad the QC test e.g. ^ZNQC |  |
| 9.  | F12   | to save and exit “Media Comment” Screen            |
| 10. | F8  | to open the window on the “Test Comment” Screen    |
| 11. | enter the appropriate result for that test  |  |
| 12. | F12   | to save and close window                           |
| 13. | <CTRL F>                                    | to status results that do not need verification    |
|     | OR  |  |
|     | <CTRL L>                                    | to status results that need verification           |
| 14. | F12, F12.....                               | to save all the windows                            |

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15. y to answer the question “Confirm editing? “
16. y to the question “Would you like to bridge to QC?”
17. enter the QC result in the appropriate field(s)
18. F12 to save
19. y to answer the question “Confirm editing? “

You will be back at the worklist for that batch of tests

20. proceed with entering results for the next specimen, do not go to “Media Comment Screen” if no more QCs were done.

### Softmicqc for the QC BENCH

#### Daily Duties

##### Keystrokes



##### Comment/Result

#### Log on to Soft micqc

1. 1 to go to Task
2. e or <enter> at Result entry to go to Result Entry
3. <enter> at the QC worklist
4. F12 to go into QC item list
5. go to each item and enter the appropriate results

If all results entered are within expected limits, go to Step 12

6. If result entered is out of range, a window for result action will show on the screen.

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7. F2 to look for options for actions to be taken
8. Pick the appropriate action. Enter code “COMM” for comment if none on the list is desired.
9. <enter> <enter> to go to the free text line
10. type in an explanation or corrective action
11. F12 to save result action
12. F12 to save QC results
13. y to answer the question “Confirm editing?”
14. Go to the next QC item(s) and repeat Steps 5 to13
15. F12, F1 to exit QC list on completing all required QC

### **Lot Registration**



On receipt of any new lot of media, reagent or panel, technologist on the QC bench will enter the new lot numbers into Soft micqc. The results of the QC on the new lots will also be entered into micqc. This is best achieved when the QC work is completed and QC results are ready for entry.

#### **Keystrokes**



#### **Comment/Result**

#### **Log on to Soft micqc**

1. 2 to go to Registration
2. type R or M or Panel for entering either Reagent, Media or Panel
3. A to add new lot
4. F2 at ID: to look up item code

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5. <enter> at the item to select
  6. F1 at the list to enter a new lot no.
  7. Type in date <enter>
  8. Type in Expiration date
  9. F12 if this is a lot not put in use immediately
- OR
- PageUp <enter> to move the cursor to "Act field"
10. Y to change Act field to "active" if this is the lot in use
  11. F12 to save
  12. Y to question "Confirm editing?"
  13. If this media requires QC done on lot receipt, the system will bridge over to enter the results. Enter the results in the appropriate fields.
  14. F12, F12..... to save and exit

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### APPENDIX VI - SOFT for micqc



1. Register all items to be QC in MICQC when received. Register the items for Q.C. under micqc, **Registration.**
  - Pick the appropriate category (Reagents, media or panels).
  - Press **A** (for add),
  - F2, select appropriate media type,
  - Record lot # (if lot has been previously tested, add -1 as a suffix for the lot #)
  - Enter expiration date
  - F12. The appropriate
  - “On receipt” QC will be generated.
  - QC organisms will be listed on the screen.
  
2. Reagents, media or panels that have QC done (other than items that are tested “on receipt” only), **must** have an **active** LOT in order for the QC to be generated. Check to see if the **current** lot being used is the same as the **active** lot when performing QC testing. Note also that when an active lot expires, the QC program inactivates it and the QC tests will not generate. When time permits, check that these reagents, media or panels have active updated lot #. Changing the active lot may result in the generation of duplicate QC procedures (the old lot and the new lot) for a day or two. Cancel the duplicate procedure on the old lot with the comment “Lot not in use”.
  
3. Report all QC exceptions to the QA Technologist or a charge technologist to ensure the appropriate action is taken. Vitek QC exceptions are initialed with a note regarding corrective action taken by the QA Technologist or charge technologist and filed in the Vitek binder.
  
4. Unusual items for which QC has not been set up can be entered under MEDIA as MISCSOL Miscellaneous Solution. (Enter description and free text QC results as comment under “F6” results).
  
5. Separate shipments of the same LOT # are treated as new lots and must be QC again. Add -1, -2, etc. to the lot # as necessary to distinguish it from the previous shipment.
  
6. Vitek panels must be entered in the Vitek QC program when received as well as being registered in MICQC. Vitek sensitivity panels must have a current active lot entered in MICQC in order to generate the weekly VT sensitivity QC. Vitek lots that are no longer in stock should be deleted from the Vitek QC program (under QC lot maintenance).
  
7. When time permits, check if new lots of reagents, kits, etc. have arrived that have not been brought to the attention of the QC bench. Lists of reagents, media and panels that are to be QC are posted by the walk-in refrigerator.

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## APPENDIX VII - Registering Antibiotics

### Registering Antibiotic Discs



1. Upon receipt of Kirby-Bauer discs, go to micqc registration.
2. Choose Reagents.
3. A (add)
4. Under reagent id type k. F2.
5. Search the list to find the antibiotic.
6. Type in the lot number.
7. If the lot has been received previously, add a letter “A” on the end of the number. If this lot has also been received previously, try “B” etc.
8. Put in the expiry date.
9. Enter. Enter.
10. Choose a label printer.
11. For number of copies, choose the number of cartridges for the lot number you are receiving.
12. F12.
13. Place cartridges with their labels (to be affixed to the cartridges when put into use.) in a polybag. Put no more than 5 cartridges in each bag.
14. Check the inventory in the freezer to see if there are any other bags of that particular antibiotic in stock. If so, and they will outdate before the new lot place the bag behind the currently used box in the freezer. Use an elastic band to group different lot numbers together.
15. Retrieve the green index card from the clear envelope on the Antibiotic freezer that is labeled “These Items Have Already Been Ordered” and place it back in position behind the yellow index card inside the freezer.



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### Registering E-test Antibiotics

1. Upon receipt of Etest strips, go to micqc registration.
2. Choose Reagents.
3. A (add)
4. Under reagent id type e. F2.
5. Search the list to find the Etest strip.
6. Type in the lot number.
7. If the lot has been received previously, add a letter “A” on the end of the number. If this lot has also been received previously, try “B” etc.
8. Put in the expiry date.
9. Enter. Enter.
10. Choose a label printer. Print out the number of labels needed, as detailed below. Cut the labels lengthwise midway through the barcode and just above the expiry date. Affix this narrow strip lengthwise.
11. Etest strips come in 3 different types of packaging: individually, 100 foam pack and multipack strips.
12. For the individual ones, you need to print a barcode label and affix to each. Wrap an elastic band around 5 strips and place them in the polybag. Affix the “date received” label to the outside of the polybag. Upon use, remove 1 set of 5 strips and place into the large conical tube in the Working Etest Rack
13. For the 100 foam pack, aseptically distribute the strips into 4 sterile conical tubes. Print 4 barcode labels. Place the conical tubes and loose labels in the polybag. Affix the “date received” label to the outside of the polybag. Upon use, 1 conical tube and 1 barcode label will be removed from the polybag. The contents of the conical tube will be dispensed into the large conical tube in the Working Etest Rack. The barcode label will be placed inside the tube as well.
14. For the multipack strips, affix one barcode label to each group of the bubble pack and place in a polybag. Affix the “date received” label to the outside of the polybag. Upon use, one strip will be cut off and placed in the large conical tube in the Working Etest Rack.
15. Check the inventory in the freezer to see if there are any other bags of that particular antibiotic in stock. If so, and they will outdate before the new lot place the bag behind the currently used bag in the freezer. Use an elastic band to group different lot numbers together.
16. Retrieve the orange index card from the clear envelope on the Antibiotic freezer that is labeled “These Items Have Already Been Ordered” and place it back in position behind the orange index card inside the freezer.
17. Retrieve the orange index card from the clear envelope on the Antibiotic freezer that is labeled “These Items Have Already Been Ordered” and place it back in position behind the orange index card inside the freezer.

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**APPENDIX VIII - Rarely Used Antibiotic**

For a Complete list of antibiotic inventory see: Kirby Bauer and E-test [Purchasing and Inventory](#) forms

**RARELY USED DISKS**



AZITHROMYCIN	AZM	FUCIDIC ACID	FD	NORFLOXACIN	NOR
CARBENICILLIN	CAR	GATIFLOXACIN	GTX	OFLOXACIN	OFX
CEFACLOR	CEC	IMIPENEM	IPM	POLYMYXIN B	PB
CEFIXIME	CFX	KANAMYCIN	PRL	PIPERACILLIN	
			K	SULPHAPHURAZOLE	SF
CEFOTETAN	CTT	LINEZOLID	LZD	TEICOPLANIN	TEC
CEFTIZOXIME	ZOX	METRONIDAZOLE	MTZ	TICARCILLIN	TIC
CHORAMPHENICOL	C	MEZLOCILLIN	MEZ	TIC/CLAV (Timentin)	TIM
CLARITHROMYCIN	CLR	MINOCYCLINE	MH	TRIMETHOPRIM	W
COLISTIN	CT	MOXIFLOXACIN	MXF		
FOSFOMYCIN	FOS	NEOMYCIN	N		

**FOR DAPTOMYCIN AND TELITHROMYCIN-SPECIAL ORDER ONLY**

**RARELY USED ETEST**

AMIKACIN	AK	CLARITHROMYCIN	CH	OXACILLIN	OX
AMPICILLIN	AM	CLINDAMYCIN	CM	SULPHAMETHOXAZOLE	SX
AZITHROMYCIN	AZ	DOXYCYCLINE	DC	TETRACYCLINE	TC
CEFOTETAN	CN	ERYTHROMYCIN	EM	TICARCILLIN	TI
CEFOXITIN	FX	GATIFLOXACIN	GA	TIC/CLAV	TLc
CEFTIZOXIME	CZ	IMIPENEM	IP	TIGECYCLINE	TGc
		TOBRAMYCIN	TM		
CEPHALOTHIN	CE	MEROPENEM	MP		
CHLORAMPHENICOL	CL	METRONIDAZOLE	MZ		
CIPROFLOXACIN	CI	MOXIFLOXACIN	MX		
		NETILMYCIN	NC		



**FOR GENTAMYCIN AND STREPTOMYCIN- SPECIAL ORDER ONLY**

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QC performed on rarely used antibiotics must be recorded in the LIS to be reviewed by seniors before finalized. In your workcard under the appropriate media, use the TESTS keypad and select **{RARE}** to populate information needed for QC purposes. Fill in all areas.

Rarely used Antibiotic:	ATCC QC strain used:	
Lot#:	ATCC expected value:	QC Valid?
Expiry date:	ATCC QC strain measured value:	

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### APPENDIX IX - Vitek 2 Weekly Susceptibility QC



1. Generate labels for saline tubes and purity plates in Soft from the receiving work list QCVTS (QC VT weekly sensi).
  - Press “A” to mark all.
  - F7.
  - R.
  - Pick a label printer.
  - F12.
  - F12
  
2. Label one saline tube for each of the 9 accession numbers that print. (Use the small non bar coded label as it specifies the ATCC strain.)
  - a) *E. coli* 25922
  - b) *E. coli* 35218
  - c) *P. aeruginosa* 27853
  - d) *E. faecalis* 29212
  - e) *E. faecalis* 51299
  - f) *E. coli* 35218
  - g) *S. aureus* 29213
  - h) *E. faecalis* 29212
  - i) *S. aureus* 29213
  
3. Label 9 Blood agar plates 1 through 9. Put a dividing line on each plate. Mark one half of each plate 1 and the other half 2. (Use the large non barcoded label as it specifies the ATCC strain.)
  
4. Affix one of large non barcoded labels printed above to the midline point of each plate.
  
5. Check the lot numbers of the AST NO20, AST P536, and the AST P532 cards in the display fridge and on the media cart to ensure that they are the same as those being used in the blood culture area. Check the sticker on the box that shows the date that the box was received. Jot down the date on the sticker. It is possible that there are multiple shipments of the same lot number. The first time a lot is QC it is referred to as isolate 1. Any subsequent shipments of the same lot number are identified as isolate 2, 3, 4 etc. respectively. The sticker date will help identify which shipment they belong to and which isolates they are. In order to ascertain that the correct lot

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numbers are in use, take one of each of the cards types and the dates you have jotted down for each with you to the Vitek 2 computer.

6. At the Vitek 2 instrument, click on Utilities.
  - Click “Quality Control”
  - Click “Load List”
  - Click “Test Type” column header. A box will drop down with the various card types.
  - Choose the card types to be tested. To highlight more than one card type, hold down the CTRL key while clicking and highlighting each card type.
  - Click “Apply”
  - Click “Sort By” “Test Type” (in lower left hand corner of screen.) (Items in the load list will be in order)
  - Click “Lot Number” column header. A box will drop down with the various lot numbers. To highlight more than lot number, hold down the CTRL key while clicking and highlighting each lot number. (This is where you refer to the dates jotted down for each lot to ensure you have QC the correct shipment.)
  - Click “Apply”





- Click  icon to print selected load list.

7. Make 0.5 McFarland suspensions of each ATCC strain using the Densichek.
8. Label one Vitek 2 smart carrier QC Machine 1 and one Smart Carrier QC Machine 2.
9. Place the inoculated Vitek 2 salines in positions 1, 3, 5, 7, 9, 11, 13 of the first smart carrier as outlined in the loadlist. Place an empty Vitkek 2 tube in positions 2, 4, 6, 8, 10, 12 and 14. (There is a template on the Smart Carrier Station near the QC bench. It outlines the position in the smart carrier in which to place each inoculum tube.)
10. Place the remaining two inoculated Vitek 2 salines in the second carrier with the corresponding empty Vitek 2 tubes as per the template.
11. Remove all lids from tubes.
12. Load the first Smart Carrier onto the Smart Pad.
13. Use the “Vitek 2 Weekly Sensi Template” to wand the barcode for the Accession ID for each organism as outlined in the load list. (It is probably easier to use the wand in

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the “Handheld Mode” for this purpose.) Note: The Smart Pad automatically defaults to Isolate 1, but you need to check the Load List printout to see if there are any lots that are not “isolate 1”. If there are, you must arrow up and put in the appropriate isolate number. Wand the barcode on the sensitivity card. Do this for each isolate.

14. Once complete, press F3 on the smart pad and ensure that everything is correct i.e. according to the load list.
15. Put the 2 smart carriers in each of the Vitek instrument readers according to the label on each.
16. Once the cards have finished processing, and the smart carriers return to the loading dock, make the appropriate purity plates from the sensitivity inoculum tube and then discard it.
17. Exchange the labels of the two smart carriers and repeat steps 7-16.

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### APPENDIX X – MEDIA Requirements On-Receipt for QC Bench

**Inventory Technician: Give the following to the QC bench when received:**



Plates	MEDIA
3	Aesculin Agar W/ Chloramphenicol, Gentamicin (EBM) *
	All Homemade Media
3	BHI Agar
3	BHI Agar W/ ccg W/ 5% Sheep Blood
3	BHI Agar W/ Casein
3	BHI W/ Gent 500, BHI W/ Strep 2000
3	BHI Agar W/ 6 mcg Vancomycin
1	Bile Esculin Plate
3	Campylobacter Agar
4	Carrot Broth
3	Chocolate Agar
3	Chromogenic Brilliance VRE Agar - (light sensitive: place plates in a Brown Bag)
3	Chromogenic MRSA Denim Blue - (light sensitive: place plates in a Brown Bag)
3	Chromogenic Urine Biplate - (light sensitive: place plates in a Brown Bag)
3	Haemophilus Selective Agar
3	Haemophilus Test Medium Agar
3	Kanamycin / Vancomycin Agar
3	Macconkey Agar With Cefpodoxime
3	Macconkey Agar With Colistin CTCZ
3	Macconkey Agar Sorbitol
3	Martin Lewis Agar
2	Mueller Hinton Agar – Large plate
3	Muller Hinton Agar – Small plate
3	Mueller Hinton Agar W/ 4% Salt
3	Mueller Hinton Agar W/ 4% Salt, 6 mcg oxacillin
3	Motility Tubes
1	MR-VP
1	Reasoners 2A Agar (R2A)
3	Visa Isolate Agar

**\*Please forward to Mycology**

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### APPENDIX XI – REAGENT Requirements On-Receipt for QC Bench

**Inventory Technician: Give the following to the QC bench for registration and QC when received:**

<b>Acridine Orange</b>	<b>James reagent</b>
<b>ALA disks</b>	<b>Kovacs reagent</b>
<b>API 20E strips</b>	<b>LAP discs</b>
<b>API 20NE strips</b>	<b>Lactophenol Blue Stain*</b>
<b>API NH strips</b>	<b>Optochin</b>
<b>BLacta</b>	<b>Oxidase droppers</b>
<b>BCarba</b>	<b>Phadobact kit</b>
<b>Bacitracin discs</b>	<b>PYR kits</b>
<b>Catalase (hydrogen peroxide)</b>	<b>Saline (3mL &amp; 0.5mL)</b>
<b>Cefinase discs</b>	<b>Salmonella serology</b>
<b>Cryptococcal Antigen Latex kits</b>	<b>Shigella serology (Remel)</b>
<b>Denka kits</b>	<b>Shigella serology (Wellcolex)</b>
<b>Bile Solubility (deoxycholate) droppers</b>	<b>Staph – Pastorex kits</b>
<b>E.coli 0157 Test kits</b>	<b>Strep group Prolex Reagents 1,2,3, ABCDFG</b>
<b>Eosinophil Stain</b>	<b>TREK Panels</b>
<b>FAB Broth</b>	<b>Tributyryn discs</b>
<b>Ferric Chloride</b>	<b>Tube coagulase</b>
<b>Fungi Fluor stain*</b>	<b>VITEK cards</b>
<b>Horse serum</b>	<b>Vitek MS Matrix</b>
<b>Indole spot reagent</b>	<b>Vitek MS Formic Acid</b>
	<b>ZN Stain kits</b>

\*Please forward to Mycology



**Note: ALL antibiotics and E-tests must be given to QC bench on receipt**

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***Record of Edited Revisions***



**Manual Section Name: Quality Control Manual**

Page Number / Item	Date of Revision	Signature of Approval
Annual Review	May 2, 2002	Dr. T. Mazzulli
Annual Review	May 12, 2003	Dr. T. Mazzulli
Annual Review	May 14, 2004	Dr. T. Mazzulli
Annual Review	May 12, 2005	Dr. T. Mazzulli
Annual Review	July 23, 2006	Dr. T. Mazzulli
Pipette check expected ranges	October 10, 2006	Dr. T. Mazzulli
Media to be sent for QC Appendix VI – revised	April 26, 2007	Dr. T. Mazzulli
Reagent to be sent for QC – appendix VII - revised	April 26, 2007	Dr. T. Mazzulli
Added – Appendix II Ordering QC organisms in Soft	April 26, 2007	Dr. T. Mazzulli
Added – Appendix III Printing QC Labels	April 26, 2007	Dr. T. Mazzulli
Refer Vitek QC to Vitek Manual	April 26, 2007	Dr. T. Mazzulli
Added – Appendix IV Order Entry for new QC organisms	April 26, 2007	Dr. T. Mazzulli
Appendix X – Weekly Susceptibility QC procedure added	April 26, 2007	Dr. T. Mazzulli
Annual Review	April 26, 2007	Dr. T. Mazzulli
Appendix X – Registering antibiotics procedure added	October 21, 2007	Dr. T. Mazzulli
Appendix X – Weekly Susceptibility QC procedure changed to Appendix XI	October 21, 2007	Dr. T. Mazzulli
Link to List of Antibiotics for QC	October 21, 2007	Dr. T. Mazzulli
Reagent, Kit QC procedure (page 19) - updated	October 21, 2007	Dr. T. Mazzulli
List of rarely used antibiotics added	October 21, 2007	Dr. T. Mazzulli
Annual Review	May 15, 2008	Dr. T. Mazzulli
Annual Review	May 15, 2009	Dr. T. Mazzulli
Annual Review	May 20, 2010	Dr. T. Mazzulli
Annual Review	May 26, 2011	Dr. T. Mazzulli
Updated culture media list for quality control Removed EV. Added VISA and Brilliance	May 26, 2011	Dr. T. Mazzulli
Updated Appendix XIII QC KB Antibiotic Inventory list	May 26, 2011	Dr. T. Mazzulli
Updated Table 1 – KB antibiotics list	May 26, 2011	Dr. T. Mazzulli
Updated Table 2 – KB antibiotics zone size	May 26, 2011	Dr. T. Mazzulli
Updated Antimicrobials MIC QC, modified into Table 3	May 26, 2011	Dr. T. Mazzulli
Updated Appendix VIII – list modified	February 28, 2012	Dr. T. Mazzulli

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Updated Appendix IX – list modified	February 28, 2012	Dr. T. Mazzulli
Updated registering of OXA and VANC screen plates	October 02, 2012	Dr. T. Mazzulli
Updated Bacteriology QC workflow	October 02, 2012	Dr. T. Mazzulli
Updated QC media list	October 02, 2012	Dr. T. Mazzulli
Annual Review	October 02, 2012	Dr. T. Mazzulli
Added ROSCO and TREK QC	October 16, 2012	Dr. T. Mazzulli
Annual Review	May 30, 2013	Dr. T. Mazzulli
Inserted proper headers, Updated UHN/MSH logo	October 2, 2014	Dr. T. Mazzulli
Annual Review	October 2, 2014	Dr. T. Mazzulli
Modify For <i>N. gonorrhoeae</i> , <i>H. influenzae</i> and <i>C. jejuni</i> : Preparation procedure p.6.	March 24, 2015	Dr. T. Mazzulli
Annual Review		
Update procedure	October 2, 2015	Dr. T. Mazzulli
Annual Review	February 5, 2016	Dr. T. Mazzulli
Updated full procedure. Remove TREK QC		
Rarely Used Antimicrobial Recording Chart added to appendix VIII – rarely used antibiotics, link added to table in antibiotic QC section Updated MSH logo in header	February 28, 2016	Dr. T. Mazzulli
C/T (Ceftolozane-Tazobactam) Etest added to Pseudo QC Remove Tigecycline from rarely used;	April 18, 2016	Dr. T. Mazzulli
REAGENT AND TEST KITS QUALITY CONTROL section added: lactophol blue Added Lactophenol blue to appendix list of reagents requiring QC on receipt.	June 7, 2016	Dr. T. Mazzulli
PRL KB moved to rarely used, removed from weekly set up.	August 19, 2016	Dr. T. Mazzulli
Annual Review Removed chart to log QC of rarely used antibiotics and replaced with LIS documentation instructions. (Appendix VIII) Addition of yearly QC of GMP media (thioglycollate/ Trypticase Soya Broth). <ul style="list-style-type: none"> <li>• Added to overview of QC chart.</li> <li>• Added organisms for QC with expected results in Organisms for media QC chart</li> </ul>	January 16 <sup>th</sup> , 2016	Dr. T. Mazzulli
Annual Review	January 26, 2017	Dr. T. Mazzulli

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<p><i>Clostridium difficile</i> 9689 ANO<sub>2</sub> Removed from QC organisms to sub.</p> <p><i>Clostridium difficile</i> removed from ANO2 control plate.</p> <p>Remove CXM (Cefuroxime) kb on ecoli. No longer in use.</p> <p>Removed Cefuroxime etest from rarely used list. No longer in stock.</p> <p>Moved TS (septra etest) from rarely used to weekly QC with e.coli ATCC.</p>		
<p>Addition of <i>Neisseria gonorrhoeae</i> ATCC 49226 in maintained QC organism list.</p> <p>Addition of ng49226 in e-tests to set up table.</p>	February 21, 2017	Dr. T. Mazzulli
<p>Addition of Vitek MS daily controls on daily QC for IC and BC bench added to LIS QC chart</p> <p>Addition of Daily Vitek MS controls to Stock Culture Sub-culturing schedule.</p>	July 7, 2017	Dr. T. Mazzulli
<p>Added result of Haze as acceptable for OX screen plate with <i>S.aureus</i> ATCC43387</p>	September 25, 2017	Dr. T. Mazzulli
<p>Addition of saline and FAB sterility testing upon receipt in reagent QC section.</p>	December 29, 2017	Dr. T. Mazzulli
<p>Trek Panels added to Reagents to be QC'd upon receipt.</p> <p>Added to Quality Review table for Vitek weekly QC</p>	January 3 <sup>rd</sup> , 2018	Dr. T. Mazzulli
<p>Annual Review</p> <p>R2A Agar Added to media QC on receipt.</p>	January 8 <sup>th</sup> , 2018	Dr. T. Mazzulli
<p>Minor format change</p>	September 14, 2018	Dr. T. Mazzulli
<p>Added Ceftobiprole (BPR) to Rarely used etest</p>	November 2, 2018	Dr. T. Mazzulli